

Appl. No. 09/964,910

Reply to Office Action of August 27, 2003

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claims 1-7 (canceled)

Claim 8 (currently amended): A gas diffusion electrode operable within a fuel cell comprising a fibrous carbonaceous material, wherein the gas diffusion electrode comprises a thickness of about 5  $\mu$ m or less.

Claim 9 (canceled)

Claim 10 (previously presented): The gas diffusion electrode as claimed in claim 8, wherein the fibrous carbonaceous material comprises carbon nanotubes.

Claim 11 (previously presented): The gas diffusion electrode as claimed in claim 8, wherein the fibrous carbonaceous material comprises vapor-grown carbon fibers.

Claim 12 (previously presented): The gas diffusion electrode as claimed in claim 8, wherein the fibrous carbonaceous material comprises a mixture of carbon nanotubes and vapor-grown carbon fibers.

Claim 13 (previously presented): The gas diffusion electrode as claimed in claim 12, wherein the mixture includes a ratio of carbon nanotubes to vapor-grown carbon fibers that ranges from about 0:1 to about 9:1.

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**Claim 14 (currently amended):** A fuel cell, comprising:  
a first electrode and a second electrode facing the first electrode; and  
a proton conductor disposed between the first electrode and the second electrode, wherein  
at least one of the first electrode and the second electrode comprises a fibrous carbonaceous  
material formed on the proton conductor, and wherein at least one of the first electrode and the  
second electrode comprises a thickness of about 5  $\mu$ m or less.

**Claim 15 (cancelled)**

**Claim 16 (previously presented):** The fuel cell as claimed in claim 14, wherein the  
fibrous carbonaceous material is selected from the group consisting of carbon nanotubes, vapor-  
grown carbon fibers and mixtures thereof.

**Claim 17 (previously presented):** The fuel cell as claimed in claim 16, wherein the  
fibrous carbonaceous material comprises a catalyst material in an amount of about 20% by  
weight or less.

**Claim 18 (previously presented):** The fuel cell as claimed in claim 17, wherein the  
catalyst material is selected from the group consisting of platinum and alloys thereof.

**Claim 19 (previously presented):** The fuel cell as claimed in claim 18, wherein the  
mixture includes a ratio of carbon nanotubes to vapor-grown carbon fibers that ranges from  
about 0:1 to about 9:1.

**Claim 20 (previously presented):** The fuel cell as claimed in claim 14, wherein the first  
electrode comprises a fuel electrode and the second electrode comprises an oxygen electrode.

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**Claim 21 (currently amended):** A fuel cell, comprising:

a first electrode, a second electrode, and a proton conductor disposed between the first electrode and the second electrode, wherein at least one of the first electrode and the second electrode comprises a carbonaceous material selected from the group consisting of at least one type of carbon nanotube, a graphite fibrous material, and mixtures thereof, and wherein at least one of the first electrode and the second electrode comprises a thickness of about 5  $\mu\text{m}$  or less.

**Claim 22 (previously presented):** The fuel cell as claimed in claim 21, wherein the carbonaceous material consists essentially of a mixture of the at least one type of carbon nanotube and a graphite fibrous material.

**Claim 23 (previously presented):** The fuel cell as claimed in claim 22, wherein the graphite fibrous material includes a vapor-grown carbon fiber.

**Claim 24 (previously presented):** The fuel cell as claimed in claim 23, wherein the mixture includes a ratio of the at least one type of carbon nanotube to the vapor-grown carbon fiber that ranges from about 0:1 to about 9:1.

**Claim 25 (previously presented):** The fuel cell as claimed in claim 23, wherein the mixture includes a ratio of the at least one type of carbon nanotube to the vapor-grown carbon fiber that ranges from about 1:1 to about 4:1.

**Claim 26 (previously presented):** The fuel cell as claimed in claim 22, wherein the carbonaceous material contains a catalyst material in an amount of about 20% by weight or less.

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**Claim 27 (withdrawn):** A method of producing a fuel cell, the method comprising the steps of:

providing a proton conductor, a first electrode and a second electrode, wherein at least one of the first electrode and second electrode comprises a fibrous carbonaceous material; and

forming the first electrode and the second electrode on the proton conductor such that the proton conductor is disposed between the first electrode and the second electrode.

**Claim 28 (withdrawn):** The method as claimed in claim 27, wherein the step of forming includes spraying the fibrous carbonaceous material on the proton conductor.

**Claim 29 (withdrawn):** The method as claimed in claim 27, wherein the step of forming includes dripping the fibrous carbonaceous material onto the proton conductor.

**Claim 30 (withdrawn):** The method as claimed in claim 27, wherein the fibrous carbonaceous material is selected from the group consisting of at least one type of carbon nanotube, a graphite fibrous material and mixtures thereof.

**Claim 31 (withdrawn):** The method as claimed in claim 30, wherein a ratio of the at least one type of carbon nanotube to the graphite fibrous material in the carbonaceous material ranges from about 0:1 to about 9:1.

**Claim 32 (withdrawn):** The method as claimed in claim 31, wherein the carbonaceous material includes a metal component having a catalytic activity in an amount of about 20% by weight or less.